

REMARKS

In the pending application, claims 1-20 were presented for examination. Applicants have canceled claim 4, amended claims 1, 2, 5, 9, 11, 17 and have added new claims 21-22. Claims 1-3, 5-21 are currently pending in the present application. Applicants respectfully request consideration of the pending claims in view of the foregoing amendments and the following arguments.

I. Rejection of Claims 4-5, 11-12 under 35 U.S.C. 112

Applicants have canceled claim 4 and have amended claims 5, 11 to remove the terms "large length-to-diameter ratio" and "low-density". Applicants submit that the deletion of the foregoing words is not a narrowing amendment. Accordingly, applicants request withdrawal of the rejection of claims 5, 11-12 under 35 U.S.C. 112.

II. Rejection of Claims 1-5 & 9-12 under 35 U.S.C. 102(e)

Applicants have canceled claim 4 has amended claims 1, 2, 5, 9, 11.

The Examiner has rejected claims 1-5, 9-12 under 35 U.S.C. 102(e) as being anticipated by Timmons et al. (U.S. Patent 6,316,148). Applicants respectfully submit that the rejection of claims 1-3, 5, 9-12, as amended, is improper because the cited reference fails to teach all of the limitations of the claims.

Before proceeding with a discussion of the cited references, it may be beneficial to discuss claim 1.

Claim 1, as amended, recites:

1. A pack-bonded, multiphase composite material for use in a cell of a battery, comprising:
at least two layers of a matrix material pack-bonded with at least one layer of a reinforcement material, the reinforcement material being substantially non-conductive, wherein fibers in said reinforcement material are oriented in a pack-bonded direction and wherein said matrix material and said reinforcement material are chemically dissimilar.

Applicants have recognized that there is a need for battery grids that have materials providing high strength while not affecting the electrochemical properties of the grid. See page 2, lines 16-21. Accordingly, applicants conceived a composite material that includes a reinforcement material that does not affect the electrochemical properties of the matrix material. In particular, applicant utilize a reinforcement material that is substantially nonconductive between two layers of matrix material. Applicants will now explain why the cited reference fails to teach all the limitations of independent claims 1, 9, as amended.

Referring to Timmons et al., the reference discloses a current collecting electrode 10 having a highly conductive substrate 12 sandwiched between two outer layers 14. See, column 3 lines 1-5. Thus, it is clear that Timmons et al. teaches away from having a nonconductive intermediate layer. Thus Timmons fails to provide any teaching of a reinforcement material being substantially nonconductive that is pack- bonded to two layers of a matrix material, as recited in independent claims 1, 9.

Because Timmons et al. fails to teach all of the limitations of independent claims 1, 9, as amended, applicants submit that claims 1, 9 and the dependent claims 2-3, 5, 10-12 are allowable.

III. Rejection of Claims 6-8 & 13-15 under 35 U.S.C. 103(a)

The Examiner has rejected claims 6-8 and 13-15 under 35 U.S.C. 103(a) based on Timmons et al.

As discussed above, applicant has amended independent claim 1 from which claims 6-8 depend. Applicant has also amended independent claim 9 from which claims 13-15 depend. Further, as discussed above, Timmons fails to provide any teaching of a reinforcement material being substantially non-conductive that is pack- bonded to two layers of a matrix material, as recited in claims 1, 9. Thus, Timmons also fails to teach these limitations with respect to dependent claims 6-8, 13-15 that incorporates all the limitations of independent claims 1, 9.

Because Timmons et al. fails to teach all of the limitations of independent claims 1, 9, as amended, and dependent claims 6-8 and 13-15, applicants submit that claims 6-8 and 13-15 are allowable.

IV. Rejection of Claims 16-20 under 35 U.S.C. 103(a)

The Examiner has rejected claims 16-20 under 35 U.S.C. 103(a) based on Timmons et al. in view of Hoshihara et al. (U.S. patent 4,906,540).

As discussed above, Timmons fails to provide any teaching of a reinforcement material being substantially non-conductive that is pack-bonded to two layers of a matrix material, as recited in independent claim 1. Thus, Timmons also fails to teach these limitations with respect to dependent claim 16 that incorporates all the limitations of independent claim 1.

Further, applicants have amended independent claim 17 (from which claims 18-20 depend) to recite a method of forming an expanded metal battery plate by "interleaving at least two layers of a matrix material with at least one layer of a substantially nonconductive reinforcement material...". Timmons fails to provide any teaching of such a method.

Further, referring to Hoshihara, the reference teaches a method for creating a lead alloy sheet 6 by rolling together a lead base sheet 1 and a lead alloy sheet 4. See column 4, lines 41-42, and lines 47-56. Because both of sheets 1, 4 are constructed from lead or a lead alloy, they are both conductive. Thus, Hoshihara provides no teaching of "interleaving at least two layers of a matrix material with at least one layer of a substantially nonconductive reinforcement material...", as recited in independent claim 17 and dependent claims 18-20.

Because the combination of Timmons et al. and Hoshihara fails to teach all of the limitations of independent claims 1, 17, as amended, and dependent claims 16, 18-20, applicant submits that claims 16-20 are allowable.

V. New Claims 21, 22

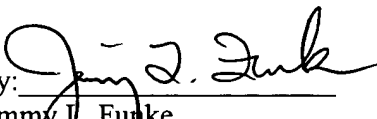
Applicants have added claims 21-22 to claim particular aspects of the present invention. Support for these claims can be found within the specification and original claims 1-20. No new subject matter has been added and claims 21, 22 are believed to be allowable for at least the same reasons as independent claim 1.

VI. Conclusion

If for any reason the Examiner feels that consultation with Applicants' attorney would be helpful in the advancement of the prosecution, the Examiner is invited to call Applicants' attorney at the telephone number listed below.

If there are any charges due with respect to this Amendment or otherwise, please charge them to Deposit Account No. 50-0831.

Respectfully submitted,

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